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EXAMINER	
CHAU, COREY P	
ART UNIT	**PAPER NUMBER**
2644	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/731,915	WOODS, WILLIAM S.	
	Examiner	Art Unit	
	Corey P. Chau	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969)..

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1 and 3-8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-7 of copending Application No. 09/393463 in view of "Feedback Cancellation in Hearing Aids: Results from a Computer Simulation", by Kates and in further view of U.S. Patent No. 6097823 to Kuo. Claim 2 of application no. 09/393463 discloses a method of processing at least one audio signal, comprising: filtering a processed signal (i.e. processing an input audio signal having one or more feedback components associated with an acoustic feedback path to provide a processed signal) by a notch filter to form a filtered signal; and sending a subaudible narrowband signal having a first bandwidth into the filtered signal to form a probe signal to probe a feedback path having a second bandwidth (i.e. generating a subaudible probe signal using the processed signal and the

detected feedback component). Claim 2 of application no. 09/393463 does not expressly disclose detecting a feedback component of the one or more feedback components in the input audio signal; feeding forward the generated narrowband subaudible probe signal to an output for the processed signal to probe the acoustic feedback path with an acoustic subaudible probe signal; and adjusting a feedback-inhibiting filter using the narrowband subaudible probe signal to inhibit the feedback component in the input audio signal. Kates discloses detecting a feedback component (i.e. feedback detection) of the one or more feedback components in the input audio signal (column 7, paragraphs 1-3); feeding forward the generated subaudible probe signal (i.e. pseudorandom noise burst) to an output for the processed signal to probe the acoustic feedback path with an acoustic subaudible probe signal (Fig. 4); and adjusting a feedback-inhibiting filter using the subaudible probe signal to inhibit the feedback component in the input audio signal (Fig. 4; column 7, paragraph 4 to column 9, paragraph 3). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify application no. 09/393463 to incorporate a feedback detection in order to disengage the normal hearing-aid system when the feedback detection determines if a sinusoid having power above a preset threshold is present at the microphone and to use the pseudorandom noise burst used as a probe sequence to inject into the system. The system can then use the probe signal to minimize the error between the observed and estimated feedback paths by using adaptive filters (i.e. adjusting a feedback-inhibiting filter). Kates discloses a pseudorandom noise burst is injected into the system as a probe

signal (Fig. 4; column 1, paragraph 3; column 5, paragraph 2), but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal.

3. Claims 2-7 of application no. 09/393463 falls entirely within the scope of the instant Claims 3-8 or, in other words Claims 2-7 of application no. 09/393463 are obvious over the instant Claims 3-8.

4. Claims 1, 2, and 9-16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 36-39, and 46-50 of copending Application No. 09/393463 in view of "Feedback Cancellation in Hearing Aids: Results from a Computer Simulation",

by Kates and in further view of U.S. Patent No. 6097823 to Kuo. Claim 1 of application no. 09/393463 discloses a method of processing audio signals, comprising: inhibiting at least one feedback component of an input audio signal by adjusting a feedback-inhibiting filter using a narrowband subaudible probe signal (i.e. feeding forward the generated narrowband subaudible probe signal to an output for the processed signal to probe the acoustic feedback path with an acoustic subaudible probe signal and adjusting a feedback-inhibiting filter using the subaudible probe signal to inhibit the feedback component in the input audio signal). Claim 36 of application no. 09/393463 discloses generating a probe signal to provide the narrowband subaudible probe signal (i.e. generating a subaudible probe signal using the processed signal and the detected feedback component). Claim 2 of application no. 09/393463 does not expressly disclose detecting a feedback component of the one or more feedback components in the input audio signal. Kates discloses detecting a feedback component (i.e. feedback detection) of the one or more feedback components in the input audio signal (column 7, paragraphs 1-3. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify application no. 09/393463 to incorporate a feedback detection in order to disengage the normal hearing-aid system when the feedback detection determines if a sinusoid having power above a preset threshold is present at the microphone and to use the pseudorandom noise burst used as a probe sequence to inject into the system. The system can then use the probe signal to minimize the error between the observed and estimated feedback paths by using

adaptive filters (i.e. adjusting a feedback-inhibiting filter). Kates discloses a pseudorandom noise burst is injected into the system as a probe signal (Fig. 4; column 1, paragraph 3; column 5, paragraph 2), but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal.

5. Claims 36-39 and 46-50 of application no. 09/393463 falls entirely within the scope of the instant Claims 2 and 9-16 or, in other words Claims 36-39 and 46-50 of application no. 09/393463 are obvious over the instant Claims 2 and 9-16.

This is a provisional obviousness-type double patenting rejection.

6. Claims 17-49 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **Claims 8-35, and 40-45** of copending Application No. 09/393463. Although the conflicting claims are not identical, they are not patentably distinct from each other because Claims 8-35, and 40-45 of application no. 09/393463 falls entirely within the scope of the instant Claims 17-49 or, in other words **Claims 8-35, and 40-45** of application no. 09/393463 are obvious over the instant Claims 17-49. The **Claims 8-35, and 40-45** of application no. 09/393463 is a broader version of the instant Claims 17-49 and is therefore obvious of the instant Claims 17-49.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 3, 4, 5, 17, 18, 20, 21, 22, 41, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Feedback Cancellation in Hearing Aids: Results from a Computer Simulation", by Kates in view of U.S. Patent No. 6097823 to Kuo.

9. Regarding Claim 1, Kates discloses a method of processing audio signals (i.e. feedback cancellation in hearing aids) comprising: processing an input audio signal (i.e. a microphone processes an audio signal by convert the audio signal into electrical signal) having one or more feedback components associated with an acoustic feedback path to provide a processed signal (Fig. 4); detecting a feedback component (i.e. feedback detection) of the one or more feedback components in the input audio signal (column 7, paragraphs 1-3); generating a subaudible probe signal using the processed signal and the detected feedback component (i.e. the feedback detection determines if a sinusoid having power above a preset threshold is present at the microphone. If so, the normal hearing-aid processing is disengaged and the pseudorandom noise burst used as a probe sequence is injected into the system) (column 6, paragraphs 1-2); feeding forward the generated subaudible probe signal (i.e. pseudorandom noise burst) to an output for the processed signal to probe the acoustic feedback path with an acoustic subaudible probe signal (Fig. 4); and adjusting a feedback-inhibiting filter using the subaudible probe signal to inhibit the feedback component in the input audio signal (Fig. 4; column 7, paragraph 4 to column 9, paragraph 3). Kates discloses a pseudorandom noise burst is injected into the system as a probe signal (Fig. 4; column 1, paragraph 3; column 5, paragraph 2), but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal

generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal.

10. Regarding Claim 3, Kates as modified discloses forming the narrowband subaudible probe signal by: filtering the processed signal with a notch filter having a bandwidth to form a filtered signal, the notch filter configured to center its bandwidth on a bandwidth of the detected feedback component (i.e. the adaptive filter models the path and then takes the inverse of the modeled signal, this functions as a notch filter); and sending a subaudible narrowband signal having a first bandwidth into the filtered signal to form the narrowband subaudible probe signal having a second bandwidth to probe the feedback path (Fig. 4).

11. Regarding Claim 4, Kates as modified discloses comparing the narrowband subaudible probe signal to the input audio signal; and adjusting the inhibiting filter in response to the comparison to inhibit the feedback component (i.e. for the LMS adaptive filter coefficient computation, the amplified noise probe

sequence is the reference input to the adaptive filter and the difference between the microphone signal and the filtered probe sequence is the error input. The Wiener filter, uses the cross correlation of the amplified pseudorandom noise sequence and the microphone signal to estimate the filter coefficients) (Fig. 4; column 6, paragraphs 1-2).

12. Regarding Claim 5, Kates as modified discloses selectively turning off the filtering the processed signal with the notch filter when the inhibiting filter is adjusted (Fig. 4; column 9, paragraph 5).

13. Claim 17 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1.

14. Claim 18 is essentially similar to Claim 5 and is rejected for the reasons stated above apropos to Claim 5.

15. Regarding Claim 20, Kates as modified discloses a combiner to subtract a derived signal from the input audio signal, the derived signal representing a version of the feedback component, the derived signal provided by the inhibiting filter approximating a response of the acoustic feedback path (i.e. the amplified noise probe sequence is the reference input to the adaptive filter and the difference between the microphone signal and the filtered probe sequence is the error input)(Fig. 4; column 6, paragraph 1-2).

16. Regard Claim 21, Kates as modified discloses the detector is adapted to determine when the acoustic feedback path will be probed (i.e. the feedback detection determines if a sinusoid having power above a preset threshold is present at the microphone. If so, the normal hearing-aid processing is

disengaged and the pseudorandom noise burst used as a probe sequence is injected into the system) (Fig. 4; column 6, paragraph 1 to column 7, paragraph 3).

17. Regarding Claim 22, Kates as modified discloses the detector is adapted to determine a range of frequencies at which the acoustic feedback path will be probed (i.e. the detection procedure uses an adaptive notch filter. The adaptive notch filter is adapted to track the frequency of the sinusoid and the coefficients are then copied to the IIR portion of the filter)(column 7, paragraphs 1 and 2).

18. Regarding Claim 41, Kates as modified discloses the filter adjuster is configured to provide the inhibiting filter with a set of filter coefficients from the filter adjuster (Fig. 4; column 5, paragraph 1; column 6, paragraph 1).

19. Regarding Claim 43, Kates as modified discloses the filter adjuster includes a modeler (i.e. LMS adaptive filter or Wiener filter) receptive to the narrowband subaudible probe signal from the output (Fig. 4), a feedback indicator parameter (i.e. feedback detection), and the input audio signal to model a response of the acoustic feedback path when the acoustic feedback path is probed with the acoustic subaudible probe signal at a predetermined frequency.

20. Claims 1, 2, 3, 4, 6, 7, 8, 17, 20, 23, 25, 27, 28, 39, 40, 41, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5259033 to Goodings et al. (hereafter as Goodings) in view of U.S. Patent No. 6097823 to Kuo.

21. Regarding Claim 1, Goodings discloses a method of processing audio signals (i.e. hearing aid having compensation for acoustic feedback) comprising: processing an input audio signal (7) having one or more feedback components associated with an acoustic feedback path to provide a processed signal (Fig. 1); detecting a feedback component of the one or more feedback components in the input audio signal (5); generating a subaudible probe signal (33) (i.e. noise signal having a flat spectral characteristic over a more limited range converging the expected range of oscillation frequencies normally would be adequate) (Fig. 1; column 7, lines 3-28; column 8, lines 29-33) using the processed signal and the detected feedback component (column 10, line 61 to column 11, line 12); feeding forward the generated subaudible probe signal to an output for the processed signal to probe the acoustic feedback path with an acoustic subaudible probe signal (Fig. 1); and adjusting a feedback-inhibiting filter (33) using the subaudible probe signal to inhibit the feedback component in the input audio signal. Goodings discloses a subaudible probe signal is injected into the system, but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and

lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal.

22. Regarding Claim 2, Goodings as modified discloses selectively delaying (29) the processed signal to compensate for a delay in generating the narrowband subaudible probe signal to allow for the use of a high amplitude level in the narrowband subaudible probe signal.

23. Regarding Claim 3, Goodings as modified discloses forming the narrowband subaudible probe signal by: filtering the processed signal with a notch filter having a bandwidth to form a filtered signal, the notch filter configured to center its bandwidth on a bandwidth of the detected feedback component (i.e. the adaptive filter models the path and then takes the inverse of the modeled signal, this functions as a notch filter); and sending a subaudible narrowband signal having a first bandwidth into the filtered signal to form the narrowband subaudible probe signal having a second bandwidth to probe the feedback path (Fig 1; column 6, lines 26-45; column 9, lines 26-46).

24. Regarding Claim 4, Goodings as modified discloses comparing the narrowband subaudible probe signal to the input audio signal (i.e. the correlator 31 looks for a correlation between the injected noise signal N and any noise

component in the residual signal formed at the output of the subtractive node) (column 6, lines 26-45); and adjusting the inhibiting filter in response to the comparison to inhibit the feedback component (Fig 1).

25. Regarding Claim 6, Goodings as modified discloses sending the narrowband subaudible probe signal at a level determined using an audibility model (column 10, lines 61-68).

26. Regarding Claim 7, Goodings as modified discloses sending the narrowband subaudible probe signal at a level determined using an audibility model includes sending the narrowband subaudible probe signal at a level about equal to a criterion level of the audibility model (column 10, line 61 to column 11, line 12).

27. Regarding Claim 8, Goodings as modified discloses sending the narrowband subaudible probe signal at a level determined using an audibility model includes sending the narrowband subaudible probe signal at a level below a criterion level of the audibility model (column 10, line 61 to column 11, line 12).

28. Claim 17 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1.

29. Regarding Claim 20, Goodings as modified discloses a combiner (23) to subtract a derived signal from the input audio signal, the derived signal representing a version of the feedback component, the derived signal provided by the inhibiting filter approximating a response of the acoustic feedback path (Fig. 1; column 6, lines 11-25).

30. Regarding Claim 23, Goodings as modified discloses a notch filter to filter the processed signal to provide a filtered signal (i.e. the adaptive filter models the path and then takes the inverse of the modeled signal, this functions as a notch filter), the notch filter responsive to a feedback parameter from the detector (Fig. 1); and a combiner (21) to combine the filtered signal and the probe signal to feed forward the narrowband subaudible probe signal to the output (i.e. the inputs to the adder 21 comprises the noise 33 and the signal limited by limiter 15 from the adder 23 comprising the signal from the adaptive filter 27, which act at a notch filter and the signal from the A/D converter 17).

31. All elements of Claim 25 are comprehended by Claims 17 and 23. Claim 25 is rejected for the reasons stated above apropos to Claims 17 and 23 (Fig. 1).

32. Regarding Claim 27, Goodings as modified discloses the probe generator is configured to generate the probe signal with a bandwidth centered on a bandwidth of the feedback component in the input audio signal (Fig. 3, lines 17-48).

33. All elements of Claim 28 are comprehended by Claim 17. Claim 28 is rejected for the reasons stated above apropos to Claim 17.

34. All elements of Claim 39 are comprehended by Claim 17. Claim 39 is rejected for the reasons stated above apropos to Claim 17 (Fig. 1).

35. All elements of Claim 40 are comprehended by Claim 17. Claim 40 is rejected for the reasons stated above apropos to Claim 17 (column 6, lines 26-45).

36. Regarding Claim 41, Goodings as modified discloses the filter adjuster (31) is configured to provide the inhibiting filter (27) with a set of filter coefficients from the filter adjuster (column 6, lines 26-45).

37. All elements of Claim 49 are comprehended by Claim 17. Claim 49 is rejected for the reasons stated above apropos to Claim 17.

38. Claim 19 isrejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5259033 to Goodings in view of U.S. Patent No. 6097823 to Kuo and in further view of U.S. Patent No. 4088835 to Thurmond et al. (hereafter as Thurmond).

39. Regarding Claim 19, Goodings as modified discloses the signal processor (7), but only generally; no specific hardware or software is taught. Therefore it would have been obvious to one having ordinary skill in the art to seek known signal processor. Thurmond for example, discloses a compressor (i.e. compressive amplifier), which is a device well known for reducing the dynamic range of the signal which passes through it thereby limiting the maximum signal to a predetermined safe level without clipping (column 3 lines 59-68). It would have been obvious to one having ordinary skill in the art to employ any know signal processor, such as that of Thurmond. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the compressor of Thurmond.

40. Claims 1, 17, 23, 24, 26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6496581 to Finn et al (hereafter as Finn) in view of U.S. Patent No. 5259033 to Goodings, and further in view of U.S. Patent No. 6097823 to Kuo.

41. Regarding Claim 1, Finn discloses a method of processing audio signals (i.e. feedback suppression) comprising: processing an input audio signal (i.e. a microphone processes an audio signal by convert the audio signal into electrical signal) having one or more feedback components associated with an acoustic feedback path to provide a processed signal (Fig. 7); detecting a feedback component of the one or more feedback components in the input audio signal (i.e. a sine wave or multiple sine waves can be generated from the detected feedback frequency and serve as the reference to the electronic noise control filter. The ENC filter will form notches at the exact frequencies, and adjust its attenuation until the offending feedback tones are minimized to the level of the noise floor) (Fig. 7; column 15, lines 4-16); Finn does not expressly disclose a probe signal to probe a feedback path. Goodings discloses a hearing aid having compensation for acoustic feedback comprising a noise generator to inject noise into the system in order to adapt a filter to produce an exact replica of an electrical signal corresponding to the acoustic feedback, the noise signal N, after attenuation (column 6, line 61 to column 7, line 28. Gooding discloses that the noise signal having a flat spectral characteristic over a more limited range converging the expected range of oscillation frequencies normally would be adequate (i.e. since the signal is not wideband, it is obvious that it is narrowband)

(Fig. 1; column 7, lines 3-28; column 8, lines 29-33). Goodings discloses a subaudible probe signal is injected into the system, but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Finn with the teaching of Gooding as modified to incorporate a noise generator to inject noise into the system in order to adapt a filter to produce an exact replica of an electrical signal corresponding to the acoustic feedback, the noise signal N, after attenuation.

42. Claim 17 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1.

43. All elements of Claim 23 are comprehended by Claims 1 and 17. Claim 23 is rejected for the reasons stated above apropos to Claims 1 and 17.

44. Regarding Claim 24, Finn as modified does not expressly discloses the at least one detector provides a plurality of feedback parameters, and wherein the at least one notch filter is receptive to the plurality of feedback parameters from the at least one detector. However it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the at least one detector provides a plurality of feedback parameters and the at least one notch filter is receptive to the plurality of feedback parameters from the at least one detector in order to provide a more efficient feedback cancellation system.

45. Regarding Claim 26, Finn as modified discloses the at least one notch filter has a first bandwidth, wherein the undesired feedback has a second bandwidth, and wherein the at least one notch filter is configured so as to center the first bandwidth of the at least one notch filter on the second bandwidth of the undesired feedback (i.e. it is inherent that a notch filter is configured so as to center the first bandwidth of the at least one notch filter on the second bandwidth of the undesired feedback in order to attenuate the undesired noise)(Fig. 7; column 15, lines 4-16).

46. All elements of Claim 28 are comprehended by Claim 17. Claim 28 is rejected for the reasons stated above apropos to Claim 17.

Allowable Subject Matter

47. Claims 9-16, 29-38, 42, and 44-48 are allowable if Applicant overcomes the Double Patenting rejection set forth in the previous Office Action.

Response to Arguments

48. Applicant's arguments filed 2/07/2005 have been fully considered but they are not persuasive.

49. With respect to Applicant's argument on pages 14 and 15, stating that "Applicant submits that a narrowband signal narrowband signal is different from an instantaneous moment of a chirp signal. Additional features must be applied to the chirp signal to use the instantaneous moment of a chirp signal as a narrowband signal, such as processing the chirp signal to obtain the instantaneous moment as a narrowband signal for use as a probe signal", has been noted. However the Examiner respectfully disagrees. Applicant has not clearly defined a "narrowband subaudible probe signal" in the claim, which can be interpret as many things such as a subaudible probe signal comprises multiple instantaneous moment of a chirp signal, wherein the instantaneous moment of a chirp signal is a short, high-pitch sound, which reads on a "narrowband signal", therefore providing a "narrowband subaudible probe signal" as discloses by Goodings as modified, Kates as modified, and Finn as modified.

Conclusion

50. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Corey P. Chau whose telephone number is

(571)272-7514. The examiner can normally be reached on Monday - Friday 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on (571)272-7848. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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August 3, 2005

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